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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/747,897	12/29/2003	Kil Min Moon	11037-180-999	6912
24341	7590	10/04/2004	EXAMINER	
MORGAN, LEWIS & BOCKIUS, LLP. 2 PALO ALTO SQUARE 3000 EL CAMINO REAL PALO ALTO, CA 94306				MCMAHON, MARGUERITE J
ART UNIT		PAPER NUMBER		
		3747		

DATE MAILED: 10/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/747,897	MOON, KIL MIN
	<b>Examiner</b>	<b>Art Unit</b>
	Marguerite J. McMahon	3747

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-14 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 12/29/03 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date: _____
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>12/29/03</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____

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## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Moiroux (4,513,697). Note a piston having an airtight cavity vertically elongated therein and utilizing sodium (see column 2, lines 3-4) as the heat transfer material partially filling the airtight cavity.

Claims 1, 2, 8, 10, and 11 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Cao et al (5,454,351). Note a piston having an airtight cavity 2 vertically elongated therein and a fluid heat transfer material partially filling the airtight cavity, wherein the upper end of the cavity is elongated above the ring mounting groove and a lower end of the cavity is elongated below the boss portion.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cao et al (5,454,351) in view of Kruse (6,164,261). Cao et al show everything except

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employing a concave portion formed on a head surface of the piston and the upper end of the cavity being elongated above a bottom of the concave portion. Kruse teaches that it is old in the art to form a concave portion on the head surface of the piston and a cooling cavity being elongated above a bottom of the concave portion. It would have been obvious to modify Cao et al by employing a concave portion on the head surface of the piston and to elongate the cooling cavity above a bottom of the concave portion, in order to improve combustion characteristics and improve cooling from the heat generated in the combustion chamber, respectively.

Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cao et al (5,454,351). Cao et al show everything except they do not disclose the percentage of heat transfer material filling the volume of the airtight cavity. It would have been an obvious matter of design choice to fill about 20% of the volume of the airtight cavity with the heat transfer material, as this percentage varies depending on the specific type of heat transfer utilized and the heat encountered during use. Note that volumes utilized in the Showalter (4,470,375) and Cobb (3,843,138) references, as seen in the Figures of these references.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Note the discussion in the Elsbett et al reference (3,730,163) at column 2, lines 45-60 of a "known method of controlling the temperature of the combustion chamber in the piston....[which is] surrounded by a number of chambers containing substances designed to provide temperature control of the combustion

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chamber wall. These chambers, which may for instance be cylindrical and may be arranged around the longitudinal axis of the piston are filled only partly with the respective substance, leaving space for its expansion. The substance may consist, inter alia, of metals that are liquid when hot and form an efficient heat transmission agent in this state, whereas in the cold state they may also be liquid, such as mercury, or solid such as sodium."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marguerite J. McMahon whose telephone number is 703-308-1956. The examiner can normally be reached on flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yuen Henry can be reached on 703-308-1946. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*MJM*  
MARGUERITE MCMAHON  
PRIMARY EXAMINER